

RELATED APPLICATIONS

General Embodiment 1

Ultraviolet radiation is composed of three ranges, namely: UVA, which is from 320 to 400 nanometers, UVB which is from which is from 280 to 320 nanometers, and UVC which is from 100 to 280 nanometers. UVA and UVB are attenuated by the atmosphere, but is still reaches the earth's surface. UVC is usually blocked by the ozone in the atmosphere. Man-made lighting sources also produce ultraviolet radiation. Most fluorescent lighting has a high output in the UVA range. UVB causes more damage than UVA, but all ultraviolet radiation will cause degradation to materials.

Ultraviolet rays from the sun, or from man-made sources, degrade many materials by breaking their molecular bonds. Dyes and inks fade from ultraviolet, plastics lose their properties, paints chalk and fade, and many other items are damaged. Strategies to combat ultraviolet degradation include the use of materials that absorb ultraviolet radiation and convert it to heat energy. Most absorbers have an ultraviolet cutoff of 365 nanometers. A few have higher cutoffs, up to 384 nanometers with little to no yellowing. The phenomenon of producing a yellow cast when absorbers are used to block all of the ultraviolet radiation is due to the gradual slope of the absorption curve of the absorbing material. This slope, when the cutoff is extended to 400 nanometers, causes absorption of violet and blue light. The absence of blue light is perceived as yellow, and it is for this reason that most absorbers, especially in clear overcoatings, are not used to block all of the ultraviolet radiation up to 400nm.